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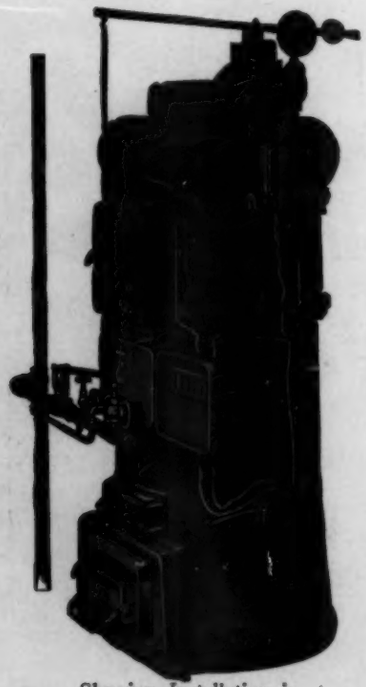

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AMERICAN
GAS JOURNAL

Vol. 124. No. 9 NEW YORK, FEBRUARY 27, 1926 Whole No. 3565

A "Super-Gas System" for Chicago

How the 22-mile 48-inch main was laid

F. L. Blocki

The Peoples Gas Light & Coke Company

THE longest gas main of its size in the world was recently opened in Chicago by John H. Eustace, vice-president in charge of operation, and W. G. Rudd, chief operating engineer, The Peoples Gas Light and Coke Company, Chicago. The new line consists of a 48-inch main approximately 22 miles long with the exception of a small section near its center where the 48-inch pipe is replaced by two sections of 36-inch pipe.

The new line runs along the entire western front of Chicago and may appropriately be called a "super-gas line" as it forms the backbone of not only the distribution system of the present city's needs, but is designed so as to take care of the expansion of Chicago for several years to come.

Geography of the Line

Geographically the line stretches from 71st street and Hamlin avenue on the south end of Chicago to Ketzei and North Shore avenues on the north. It took three years to lay and was completed at a cost of $4,500,000. The pipes contain over 76,468,000 pounds or over 38,200 tons of cast iron. Where the line connects with small "feeder" lines, branching off to various parts of the city, there are 19 valves, each 48 inches in diameter, measuring 16 feet in length and weighing over 7½ tons each.

The main consists of 12-foot lengths of pipe, each weighing four tons. Over 9,500 lengths were used. During construction the first year bell and spigot cast iron pipe was used. After that plain and cast iron was employed entirely.

Special concrete tunnels 9 feet in diameter had to be built where the main crosses the drainage canal. The first tunnel was built under the south branch of the drainage canal at Crawford avenue at a depth of 72 feet, running 1,560 feet underground. A second tunnel 65 feet deep was built under the north shore canal at Petersen avenue. This is 190 feet long. At two other places small bridges were constructed to carry the main over drainage ditches.

The average depth to the bottom of the main is 7 feet. All of the work of excavating, setting pipe, back filling, and most of the paving was done mechanically.

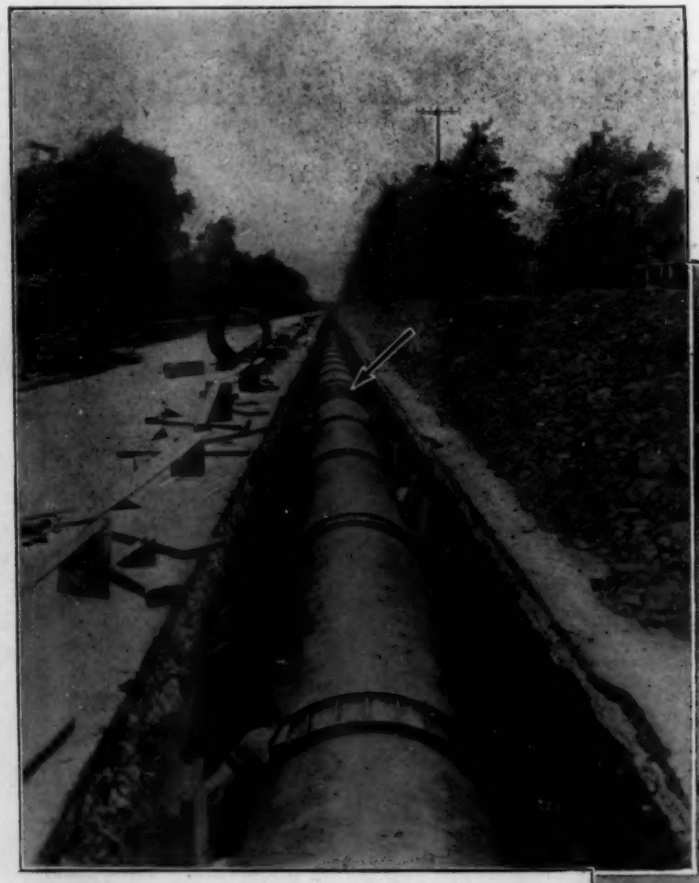
One Hundred Million Cubic Feet Daily Capacity

The new line will be capable of conveniently distributing upwards of 100,000,000 cubic feet of gas every 24 hours, this being more than the average gas consumption of the city for that length of time. When the industrial and residential demands, not only of the west side, but of all Chicago increase, the capacity of this line can be increased to over 200,000,000 cubic feet every 24 hours. This main thus not only provides for future expansion but also acts as a main feeder belt across the westerly side of Chicago to supply gas to practically all intersecting mains, assuring Chicagoans of a sufficient gas supply for years to come.

"Before starting the work a very thorough survey was made," said John A. Williamson, supervising engineer, in describing some of the high lights of construction. "For the part laid in 1924, four men spent about two months for this section of the line alone. Similar care was exercised in the survey for this year's work.

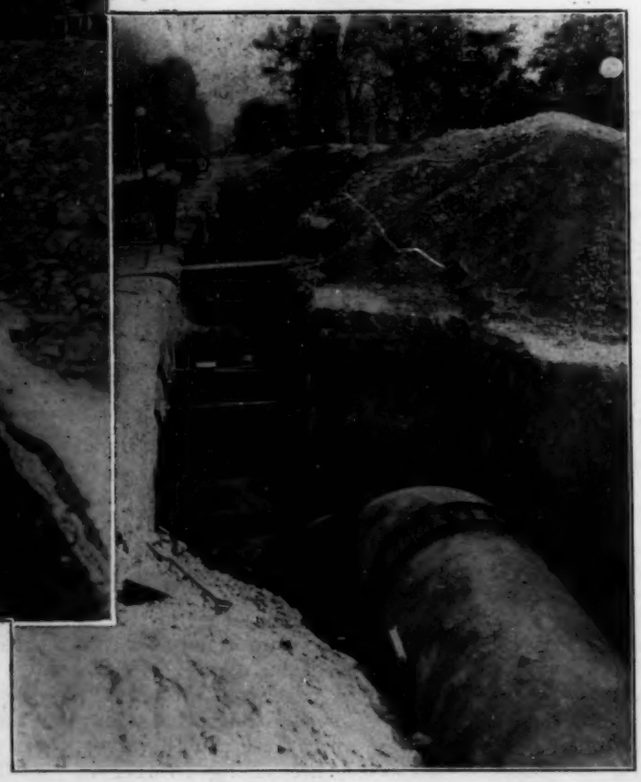
"First of all, a tentative route was picked out, and prints were obtained from the Sewer and Water Departments of the City of Chicago, the Common-

wealth Edison Company, the Bell Telephone Company, Police and Fire Alarm System of the City of Chicago. These prints were studied as to what obstructions we would encounter in the way of other utilities and temporary layouts were made. Then it was necessary to spend a few days in the field making a surface survey to ascertain the kind of pavement we would encounter, frontage on the different streets, etc. After all the data were compiled, a final route was picked out, paying particular attention to sewers, which are almost impossible to move. Final layouts were made showing both in plan and profile our proposed main, the sewers, water lines, electric lines, telephone and telegraph lines and other utilities in the streets we were to lay in, and also streets crossing our line of main. Special sections were made for points where the conditions were more congested and the work more difficult.



Above:
Stretch of ditch showing testing cap at center.

Below:
Using 45° bends to go under water main and telephone conduit which could not be moved. Water main seen at center at right angles to gas main. Telephone conduit in foreground at bottom of bend.



Piping Used

"The pipe used the first year was bell spigot sand cast pipe, the balance was all plain end sand cast iron pipe and was furnished by the United States Cast Iron Pipe Company. It was delivered in carload lots to designated yards along the line, and unloaded and strung on the street ahead of the actual work. The unloading and delivering of this pipe to the job was carried on as follows: An automobile truck with especially constructed body was pulled alongside the car, the pipe rolled onto the truck and taken along the street where it was unloaded by dropping it onto padding consisting of a piece of old automobile truck tire nailed to the bottom of a 12" x 12", about 6' long, at one end of which was attached a bumper; on top of the 12" x 12" were several rope bumping pads. It is interesting to note that with this method of handling and using only three automobile trucks and six men, including the drivers, no pipe was cracked or broken on the job and to my knowledge not one dollar of demurrage was chargeable to the job.

The Joints

"The bell spigot pipe was laid with the cast lead joint while the plain end pipe was connected together by means of a Dresser coupling, manufactured and supplied by the Dresser Manufacturing Company of Bradford, Pennsylvania. Both sizes of coupling used in this work, namely, 36" and 48", were made of steel and consisted of five parts: two follow-up rings, ½" long and 1" high, one inner ring, 10" long, and two lead-tipped rubber gaskets, 1⅝" long and 21/32" thick, with a 1" tapper, of which ½" was covered with lead. All the couplings were constructed the same with the exception of the diameter and the number of bolts used to make them up. The inside diameter of the couplings in each size was 3/16" larger than the outside diameter of the pipe.

"It was found necessary to use a lubricant to insure sending the gasket home in the coupling on account of friction caused by the rough surface of sand cast pipe. For this we finally decided on a waterproof cement furnished and manufactured by the Smith-Totman Company of Chicago. This cement has the appearance of a heavy shellac and was applied with a brush. We found that it not only answered the purpose of a lubricant but also filled up any small openings in the surface of the pipe where the gasket had not made a joint, and when hardened, formed a good seal. Thirdly, it coated the gasket and I am sure will act as a good preservative for the rubber.

Valves and Fittings

"The valves and fittings used in the line were made of a special semi-steel by the National Machine Works of Chicago. The valves were extra heavy flanged valves and were tested to 50 pounds pressure at the factory. All the bends were of semi-steel and were plain end so that a Dresser coupling could be used in putting them into the line. Flanges plain end pieces of pipe of the same material were used to make the connection between the plain end pipe and the flanged valves, a Dresser coupling being used on the plain end.

"The drip pots used in this line were of a special designed line drip consisting of three parts, a plain end flanged tee with a flanged pot bolted to the tee; a baffle plate was inserted in slots through the center of the pot, going within 6 inches of the bottom and extending up into the tee about 6 inches, which would tend to stop any water being carried past the pot, were the gas moving at a high velocity. These pots were made of semi-steel by the National Machine Works of Chicago.

The 'Special Gas Offset'

"It was found necessary, on account of a gas main, a telephone line, and some sewers, which for one reason or another could not be moved, to design a special fitting known as a special gas offset. This fitting was 48" in diameter on either end and tapered to a point near the center, then flattened out to 22" in diameter. It was 9 feet wide, and was so designed as to give the center section the same volume as a 48" pipe of the same length. With this fitting it was possible to go either over or under an obstacle not exceeding 5' in diameter. To make handling and installation easier, the offsets were made in three sections, the two end pieces being flange plain end and the center piece flanged flange.

"During the first two years, the ditch, 6' wide and an average of 7' deep, was dug by a gasoline-driven, single bucket Austin trenching machine equipped

Bridge Over North Branch of Chicago River Supporting 48" Main.

with side cutters. Trouble was experienced with the side cutters and quite a lot of time was lost due to this device so the last year a double bucket Austin machine was used with good success. A crew of six men, working in pairs, would follow the machine and as the ditch was dug they would trim the bottom, dig the bell holes and place the blocking for the pipe.

Blocking Used to Give Solid Foundation

"One, two and three-inch blocking was used to give the pipe a solid foundation and to hold a grade. This was placed about 2 feet from the end of each pipe. The elevation of these blocks was obtained by placing a straight edge from the inside of the coupling on the last pipe which had been laid to the first block and using a spirit level carrying a slight grade either up or down, depending whether the line was running from or towards a drip.

"The next pipe was then put into place, using a gasoline-driven Northwest crane, handling the pipe by means of a wire sling around the center, the pipe having been cleaned with a wire brush and fitted with a follower ring and gasket on one end and a follower ring, gasket and inner ring on the other end. The pipe was then let down on the block, leveled by using a spirit level, and shoving up on the blocking under the pipe with shingles, lined up, and wedge put in on the blocking to keep the pipe from rolling, 2" plank and wedges put alongside the pipe and braced to the side of the ditch, and crane then was released from the pipe and with the laying gang went ahead to the next length of pipe.

Surveying Work

"The civil engineer with the gang took levels on every fourth or fifth pipe with a surveyor's level, both to keep a check on the grade of the line and to be used as data for permanent records. Two joint men, or mechanics, then came along to make up the coupling. They would slide the two follower rings and gaskets back on the pipe, inspect the inner ring to see if there was an equal distance between the pipe and coupling all the way around, apply the waterproof cement, insert the bolts, which had been loosened and oiled, and make up the joint, using a special ratchet wrench adapted for use on the Dresser coupling, paying special attention to pulling the joint up even all around. They would pull up four bolts, on on each quarter, until they were snug, and then, after bringing the other bolts up, would work opposite each other. We found that great care had to be taken in making the joint, as it was a simple matter to turn the gasket over or to find that it was not in place, which usually happened at the bottom of the coupling.

Making the Joints

"Two men made a joint in about an hour. In one case two very good men made a 48" joint in 19 minutes and it was tight when tested, but one could not expect them to keep up this gait. After several lengths of pipe had been laid, especially designed testing caps were placed on each end of the line as laid, a gap of one pipe being left out and the laying gang going ahead. These caps, made from Dresser couplings and with convexed steel plate head welded in them, were tightened on in a similar fashion to the Dresser couplings and were braced against the next six or seven lengths of pipe laid by means of long ditch braces and head blocks against the caps. The line was then pumped up with air to 25 pounds of pressure and each joint tested, using soap suds applied with a paint brush. If a leak was discovered, and we were unable to stop it by pulling the coupling up tighter, the joint was marked and after the line had been tested the pressure was released and the joint re-made and a re-test put on the line.

Breaking Through Pavements

"When we began running into paved streets and other utilities, the pavement was broken in a line, laid out by the engineer, with the gang, using an air compressor supplying air to air hammers equipped with asphalt cutters and concrete breakers. Our preliminary work served us in good stead, as it was not necessary to deviate in any case from the pavement, which was cut sometimes several blocks in advance of the work. The utilities encountered were either lowered, raised, or moved to one side by the company owning them, who had been supplied with the elevation of our line at that point by our engineer. One does not realize what can be encountered in a street unless they have had an experience similar to ours the last three years. There was hardly a street or alley crossing our line which did not contain one or more utility lines which had to be moved. Fortunately, our survey had been so thorough that they could be moved ahead of time, and we did not damage one thing with the digging machine. Of course, there were house drains, water and gas services, which had to be lowered all along the line, but this work was done as we went along, the water and gas services before the ditch was dug, and the house drains before the pipe was laid in the ditch.

"Many interesting things were encountered during the course of the work.

Crossing the Chicago River

"When it was necessary to cross the branch of the Chicago River, steel riveted flange pipe was used. This pipe was made by Pratt & Company of Chicago, and was delivered to the job in three sections, one 70 feet long and two 20 feet long. They were made upon the south bank of the river, a temporary blank flange put over each end, and pushed into the river, where one end was floated to the north bank; then, using a steam shovel on one side and a Northwestern crane on the other, the pipe was raised and put in place on stanchions which had already been placed and tie rods were strung from end to end to strengthen the span. The piece was then hooked

onto the cast iron line by using flange plain end filler pieces on either end.

"The ditch under all street car and railroad tracks encountered was dug by hand and service on the lines was not interrupted. I think the longest delay on a street car line was 13 minutes. The pipe was put in from either side after the ditch was dug, using small iron rollers on planks as a means of moving it ahead. No joints were made up until all the pipe was laid under the track to enable a length to be moved a fraction one way or the other to meet the pipe from the other side.

The 24" connections to be used for feeder lines were laid out as follows: A flange plain end piece was put into the line, to the flange end was bolted a valve, to the valve a 36" x 36" x 24" or a 48" x 48" x 24" tee, whichever the case called for, then the other valve and plain end piece were put on and the line continued, a valve and blank flange was then put on the 24" opening to be connected to the 24" lines at a later date.

Passing Under a Telephone Line

"At one point in the city a telephone line was encountered which could only be moved at a great expense. Here we used a 48" gas offset and went under the telephone line and kept our grade intact.

"At another point we encountered a railway subway, a shallow sewer, and a short block north a 30" water main. It was impossible to go over the water main and sewer, and on account of the subway, and the inadvisability of dropping too quickly with the Dresser joint, it would have necessitated dropping gradually from quite a distance south of the subway and coming up to grade slowly after passing the water main. This would mean an expensive deep ditch for some distance and too much cover on our main. To counteract this, we ran on our grade close to the sewer, then dropped suddenly by using two plain end 45° bends, one to go down, and the other to straighten out the line. We ran thus until we passed the water main, where we came up suddenly again, using two plain end 45° bends, one to come up with and one to straighten out the line. Similar conditions at other locations were met in the same way.

"Special offsets were again brought into play where we encountered very shallow sewers, but deep enough that they would have given us seven feet or better cover over our main. Here we went over the sewers by using the offsets.

Turning Gas Into the 48-Inch Main
Left to Right: W. G. Rudd, Chief Operating Engineer, and J. H. Eustace, Vice-President in Charge of Operations, The Peoples Gas Light & Coke Co.

Using Bends

"In crossing a boulevard, it seemed that every utility in the city had a line in our way, so to keep from moving them, we made two drops at different points, using 22½° bends. No 90° bends were used in the line. In their stead, when it was necessary to make a 90° turn around a corner, two 45° bends were usually used with a piece of pipe between to make the bend more gradual and thereby reduce friction and loss of pressure.

"In summing up, in 1923, 1924 and 1925, a total of 22 miles of pipe were laid in this line, divided into 18.5 miles of 48" and 3.5 miles of 36" main, the working period of each year being from May to October. The lay for an average day was between 30 to 40 lengths of pipe or 350 to 500 feet and the record day was in August, 1925, when ditch was dug for 101 lengths of pipe or 1,230 feet and 95 pipe or 1,150 feet were laid in 11 hours, using a gang of 55 men."

Sales—A National Problem *

Its answer in the Orange Star campaign

C. E. Paige

Vice-President, Brooklyn Union Gas Company, Bro oklyn, N. Y.

IT would be pleasant to spend some time in reminiscence, to discourse at some length on my lively appreciation of the friendly atmosphere which always exists at these meetings and especially to thank again the membership for their many courtesies to me as a member of this association and a former officer.

I am, however, sent here with a commission. I have been drafted by the American Gas Association to deliver a message.

This I agreed to do. I am selfish. I wanted to do it for the opportunity it gives me to greet you all and because I share your very great interest in the gas business of today and even more especially the industry of tomorrow.

Dealing with Facts

Let us deal with facts and let me make one point clear. Whatever I may say regarding the facts of our situation, please understand that I am more optimistic as to the future of the gas business than I have ever been. I believe the business rests more soundly on economic law, there is certainly no disillusion as to its problems, the prospect is clearer and the industry is awake.

The subject on which I am to speak is, "Sales—A National Problem and Its Answer."

You have seen a circular describing the National Co-operative Domestic Sales Plan, formulated and sent out by the managing committee of the Commercial Section of the American Gas Association.

C. E. Paige

I presume you are familiar with it in direct proportion to your interest in new gas sales possibilities. I wish to do what I can to reawaken the interest of those who are already impressed by it and to encourage those who, by giving time in conference and committee, have evolved this plan.

Plan Not Absolutely Perfect

The committee recognized that the plan is not perfect. It is as perfect as experience will permit.

Emerson says that nothing really great was ever accomplished without enthusiasm. The enthusiasm with which we co-operate on this plan will establish perfection for it more quickly and more completely than anything else can.

Our business is peculiar, as you gentlemen know. Its existence in its early day depended on gas lighting. Development into others of the five thousand uses now established came largely in very recent years. When gas lighting began to lose its popularity, domestic utilization of gas for cooking and heating water became more popular, with the result that the loss of output due to lighting was more than made up by the sales of gas for other household services.

In the same way we have felt that any loss in domestic load which might be experienced due to competitive fuels would be more than made up by the volume of gas sold for industrial purposes, and still, in the offing, we look for the day when gas for house heating will transcend all present output figures.

More Possibilities in Domestic Load

But I anticipate my story somewhat because we are by no means at the end of our possibilities with respect to domestic utilization of gas, and I do not mean refrigeration. I mean for just the very things for which gas is now most popular. But we must recognize that our great merchandising enterprises have found the cheapest and most effective way of accomplishing their ends which had to be on some basis of co-operation.

Other products which are sold by competitive dealers owe much of their popularity to the fact that these dealers found that their interests were best advanced by getting together and establishing a national popularity. We have much more to gain, because we are not competitive and there is not the feeling that one dealer will get more advantage out of the plan than another might who contributed equally. Moreover, their product often is limited to the field of a certain definite need, while in our case our interests are completely interwoven with the comfort, happiness and prosperity of our entire urban population, both from the domestic and industrial points of view.

Therefore, our appeal should be much more productive than almost any other.

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*An address delivered at the Annual Meeting of the N. E. Association of Gas Engineers.

The Value of the A. G. A.

The committee has done a good work in preparing this plan. It is but a part of the constant effort of the American Gas Association to make itself of more value to its members and to the industry. Who can say that the association is not of practical advantage —but, on the other hand, who can point to tangible figures which represent the value of the association to any company or individual.

We do know this, that without the association we would not have the economic stability in our business of which we are now so proud. We would not have the optimism which is the result of their publicity work by reason of the interchange of information which they make possible.

And now a committee of this association offers a specified plan called the National Co-operative Gas Sales Plan. This plan has a two-fold objective. The first is to develop in the consumer's mind an insistence that the appliances which he purchases are modern, efficient and safe. This involves a national activity on the part of the national association to see that such appliances are produced and to see through the effort of their testing laboratory that the requirements of modern practice are met and finally to establish a badge of identification by which such appliances may be identified and the manufacturers of those appliances characterized. The symbol is the orange star; the circular describes its use in detail.

To Increase Sales of Gas

The second objective of the National Sales Campaign is to increase the sale of gas.

This aim is to be accomplished by conducting promotional campaigns in a number of towns to create in the public mind the idea of putting a complete unit of gas appliances in the home, just as the plumbing appliances are installed as a unit. The "ideal" installation will be symbolized by the Orange Star, just as the ideal appliance is so marked. By suitable publicity and promotion of the Orange Star Home, it is believed that the customer's habit of buying his gas equipment piecemeal may be changed to the point where he will be ready to buy and install at least the minimum outfit for real home comfort.

Three towns have already tried out this domestic sales program and have found it practical and successful. More cities and towns will be covered in the same way in the near future, as the facilities of the A. G. A. permit.

Many Projects Come to Our Attention

We are confronted many times a day with projects brought to our attention, many of great merit.

We are invited to participate in general publicity efforts and to give our time and money to civic and philanthropic enterprises. These are all worthy things, but in consideration of their importance to the community and the desirability of our participation let us also remember that the measure of our value is determined by our sales of gas.

As to business matters, regardless of how we may deal with miscellaneous projects brought before us, we must give attention to anything which will increase the sale of gas.

And here we have a plan, not a one-man idea, and not one suggested by an inexperienced amateur. It is the product of professional minds which we employ for this purpose, men who are paid to do the very thing they now provide, without whose efforts the industry would be millions of cubic feet per year behind its present mark.

There are, I repeat, men with a professional idea. Executives have hired them, executives must support them.

This plan should be tried, not by reluctant acquiescence, but by active recognition, encouragement and inspiration.

Architects' Prize Contest

As one feature of this plan the committee has outlined an architects' prize contest, and I quote from a letter received recently:

☼ ☼ ☼ ☼ ☼ ☼

Women Who Operate
Their Own Gas Plants
WOMEN who use coal or wood in their stoves, really cook with gas—but it's gas of their own manufacture.
They buy fuel in the raw (just as we do) and then endure drudgery, dirt, soot, smoke and ashes before they finally convert it into fire.
"If it's done with Heat—you can do it Better with GAS"
We take the raw fuel, treat it to recover valuable by-products, dispose of the useless residue and deliver the clean, useful element—gas fuel—direct to you through a pipe.
Ten million American women have already junked their individual gas plants and have cast their fuel burdens on the gas companies. Other women are joining them at the rate of 400,000 a year.
(Your Name and Address Here)
A.G.A.-533

The Drudgery of the Coal Stove Aptly Illustrated

"A national architectural competition has just been started by the A. G. A. Mr. William Adams Delano, of the well-known firm of Delano & Aldrich, of New York, has been secured as the architectural adviser in drafting the program of this competition. This competition is being announced to architects through advertisements in the architectural journals and by means of mailings to 8,000 architects.

"This competition calls for designs for a small home costing approximately $12,500, which shall be adequately equipped for gas service. The prizes offered are larger than usual and are attracting much interest in the competition. The first prize will be $1,000, the second $500, the third and fourth $250 each, and five more of $100 each, besides nine honorable mentions.

"The competition does not close until May 15, but already the A. G. A. has received many requests for programs—and, very important to us, data on piping. flues and appliances.

"The competition has great possibilities for publicity, not only among architects, but also among our customers, as the results of the contest will be broadcasted through releases to newspapers, periodicals and other mediums.

"Plans are now being made to encourage the building of model homes from the prize winning designs to demonstrate gas uses; and other distribution of designs will be made."

Conclusion

The sales of gas may increase without any effort. They will surely increase and to a far greater extent if sales effort is properly directed.

This plan seems practicable to me. It seems sane and reasonable. I believe in it.

I consider that whether or not I like the details of this particular plan the fact remains that we have asked the men in the industry best qualified of all to give us something. This is the result of their work. We must assist them and in so doing help our industry toward a realization of its possibilities.

The Future of Gas in Industry*

Accurate comparative thermal data necessary to progress of industrial gas

H. E. Broughton and H. C. Haroldson

Jackson, Mich.

IN attempting to write on this subject we will begin by admitting to plagiarism but it will always be thus so long as men continue to learn from one another. So many articles have been written on this subject that many of us, after a casual perusal, are prone to dismiss the text of them from our minds as visionary dreams. We shall therefore try to be as analytical as possible in our discourse and leave it to you gentlemen to decide in your own minds as to what the future of gas in industry shall be, for in that decision and that realization lies the real future.

In order to predict what the fuel of the future will be we must eliminate the fuels which obviously cannot survive. These are the solid and liquid fuels.

Solid fuels are objectionable because of ash troubles, sulphur in the furnace gases oxidizing atmospheres, and lack of temperature regulation. The sluggishness of combustion of solid fuels necessitates large combustion chambers in large furnaces, with their concurrent large radiation losses.

"Both solid and liquid fuels, before they can be properly burned, must go through the various preliminary stages of atomization, volatilization and gasification, and a certain amount of energy must be consumed to change them to gas."

Oil

"Oil at present gives us a great deal of competition and while the position of the oil industry is strong at present and there is nothing to indicate a serious shortage in the near future, it seems to be the consensus of opinion among observers of the oil situation, that there will eventually be a shortage in that field. However, we must not sit supinely by and wait for an oil shortage to develop, because most of us will probably not be living when that time comes. There are so many drawbacks to the use of oil as industrial fuel that with its difficult burner adjustments, automatic control, uncertainty of supply, etc., we should have no difficulty in eventually eliminating it, as rates are made, appliances are developed and advertising is done.

We have left then, gas and electricity. These forms of heating energy, because of their suitability to automatic control, cleanliness, instant availability, etc., seem to be the certain industrial heat mediums of the future, and they will be used instead of our solid and liquid fuels, because labor costs, furnace maintenance and material spoilage costs can all be reduced to a minimum.

Electricity

We have now to eliminate electricity. How can we do this? The large manufacturers of electrical heating

*Read at the 1925 Convention of the Michigan Gas Association.

equipment, with the masses of information which they have gone to an enormous expense to disseminate, have almost succeeded in converting even the gas men to the fact that electricity can be utilized for industrial heating operations more cheaply than other fuels.

Electricity is as highly efficient and equally desirable as gaseous fuel, but, its first cost is a drawback if the comparison is properly presented.

Many of us feel disgruntled at times on the question of industrial rates. We feel that our work would be so much easier if the rates were lowered. This may all be so and our rate departments will undoubtedly cooperate as they can justify a loss in revenue for a time, in order to build for the future.

Appreciating the necessity of reduction in price to wholesale consumers, sliding scales have been in use for a considerable time. Now, the more flexible demand rates are coming into use. The application of these demand rates will affect the long hour industrial user who should and can be especially favored.

A Comparison

We will take then, for comparative purposes, a price for gas, which on an industrial rate cannot be considered too low, and an electric rate which cannot be considered high. Then a 550 B. T. U. gas at $1.00 per thousand cu. ft. costs about $1.80 per million B. T. U.

Electricity at one and one-half cents per K. W. hr. costs about $4.40 per million B. T. U., or an increase of 144%. Therefore, even if these are competitive rates, a gas furnace, be it only 40% efficient, can still compete with an electric furnace which is 100% efficient, if such an appliance can ever be evolved.

D. J. Demorest, professor of metallurgy, Ohio State University, says: "In recent years, there has been a great improvement in the design of fuel fired furnaces and burners. As a result the best designed gas-fired furnaces now compare favorably from the standpoint of equality of product with electric heated furnaces. As a result it is nearly correct to decide what type of heating equipment to use on the basis of cost of heating alone."

Following is a table of comparative fuel costs. An examination of the figures shown makes it obvious that electricity is out of the question.

Gas the Logical Fuel

From an economic viewpoint, gas seems to be the logical and ultimate fuel.

Electrical engineers in the most modern plants are talking of producing 1 K. W. hr. of electricity for every pound of coal burned. Even if an efficiency of production of 25% can be realized in the electric plant, the gas plant with an overall thermal efficiency of from 65% to 85% must still survive.

Some people say that the hydro-electric station is the answer. Hydro-electric stations now provide about 35% of all the power generated and every horsepower so generated saves about four tons of coal a year. However, most of the available water power sites have been taken and very often, due to the cost of construction of hydro-electric stations, and the expense incident to long distance transmission, power can be generated more cheaply in the steam plant, so it seems reasonable to believe that the steam plants will continue to go on carrying the largest part of the country's power load.

Coal is one of the most important of our nation's resources and there can certainly be nothing wrong with an industry which is a paragon when conservation is considered.

Coal the Basic Fuel

"Gas is the direct product of coal, and coal is the inevitable fuel basis upon which civilized life will continue to be established."

"The use of electricity for heating is the direct opposite to fuel conservation." Why, then, is electricity making so much progress in this field? Because the electrical industry is exploiting the good points of its product. We find it even in the daily papers. There appeared last March in a Detroit paper, under the headline, "Electric Heat for Industries; Gas for Homes," in an article by an industrial heating engineer in the service of one of the power companies. We quote the article in part:

"It is quite true that electricity cannot and may never be used for heating houses. It is equally true that gas cannot and may never be economically used for melting steel, etc.

"In between these two extremes in heating are thousands of heating jobs, many of which can be done bet-

GAS
The fuel that conserves national resources
COAL
THE imperative need for conserving national fuel resources is focusing attention on the potential service of the gas industry. It has been estimated that the nation's coal resources would last at least twice as long if all operations requiring heat were done with gas instead of coal in the raw state.
The constant expansion of the gas utility is the inevitable answer to a many-sided demand. Representing the most efficient utilization of heat sources, it serves a national purpose. Supplying a practical and economical fuel, it is in increasing demand in homes and industries.
Write for the booklet—"Gas, an Essential Utility and an Opportunity." It explains why every class of investor is interested in the steady growth of this great public utility.
HAMBLETON and COMPANY
Investment Bankers
NEW YORK and BALTIMORE

The Gas Utility, a Fuel Conserver

ter with gas and many of which can be done better and more economically with electricity.

"We burn approximately five tons of coal to obtain the equivalent of one ton of coal in electric heat. In manufacturing gas, five tons of coal yield the equivalent of four tons of heat units. But the resulting heat units of electricity are net, for the flue losses and combustion losses have been taken in the power house. The gas units are gross for the flue losses must be taken at the place where the gas is burned.

"At low temperatures, such as house heating, these losses are comparatively small, but on an industrial furnace operating at 1,600 degrees Fahrenheit, of our gas units, which are equivalent to four tons of coal, less than one ton is available for useful work, the balance going to make up the combustion and flue losses. The above figures explain why electric heat for industrial heating is making rapid progress.

"Electric heat is a boon to the manufacturer, because of its ability to produce economically a uniformly good product, but it is a God-send to the factory worker, for it eliminates the hot, uncomfortable working conditions usually found in shops where fuel furnaces are used."

He concludes by saying: "What gas will do for the house owner, electric heat is doing for the manufacturer."

Typical Electrical Propaganda

The above is typical and characteristic of the type of propaganda which the electrical man is schooled to turn out.

The layman would gather from the above article that it is impossible to get more than 25% efficiency with gas, also that a gas furnace cannot be insulated against heat losses.

The truth of the matter is, by the use of recuperators, utilizing a part of the heat of the flue gases for preheating the air for combustion, savings of from 20% to 80% are being shown over non-recuperation.

The use of insulation is not prohibited on gas furnaces and thus further heat savings may be made, and the comforts of the workmen insured.

Use of Proportional Mixers

At the present time, proportional mixers for use with both high and low pressure air have effected gas savings of 35% and even 50%. These proportional mixers are comparatively simple devices which can be installed on any existing two-pipe installation. They permit single valve control and thus eliminate guesswork on the part of the furnace operators as to the proportioning of gas and air. After they have once been regulated, constant proportioning is automatically maintained and any desired furnace atmosphere may be held over a wide range of turndown. They also lend themselves admirably to automatic temperature control and thus further savings are made as more possibility of human error is removed, and spoilage costs due to overheating, etc., are lowered.

It is not our intention to enter into any recriminations with the electrical fraternity, but we find that cost comparisons have been made on new, up-to-date electrical equipment as against worn-out, obsolute gas equipment. We also find that the information disseminated comes from the large manufacturers of equipment and not from the power companies themselves.

Very likely the comparisons are made in absolute good faith and being so, whose fault is it if not ours? There has been scarcely any advertising of the good products of the manufacturer of gas equipment.

The manufacture of electrical appliances is centered in the hands of two or three large companies. Gas equipment is made by scores of small manufacturers

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Comparative Fuel Costs

Source of Heat	Per Cent Air Excess	B. T. U. Value of Fuel	Temp. Furnace, Degrees F.	Price of Fuel or Electricity	Cost per 100,000 B.T.U.	Per Cent Heat Lost: In Flue Gas Non-Recuperating	Per Cent Heat Lost: By Recuperating	Per Cent Heat Lost: By Radiation	Cost per 100,000 B. T. U.: Without Recuperation	Cost per 100,000 B. T. U.: With Recuperation
City Gas	10	535	400	$75 per M.	$.140	6.5		6	$.158	
Electricity	..	3,415 per K.W.	400	1½c per K.W.	.440	0.0		5	.456	
x Fuel Oil	20	135,000 per gal.	400	$.06 per gal.	.045	8.5		5	.052	
City Gas	10	535	1600	$.75 per M.	.140	31.0	16.0	10	.238	$.185
Electricity	..	3,415 per K.W.	1600	1½c per K.W.	.440	0.0		10	.488	
x Fuel Oil	20	135,000 per gal.	1600	$.06 per gal.	.045	43.0	22.0	10	.096	.065
City Gas	10	535	2300	$.75 per M.	.140	46.5	20.0	15	.364	.240
Electricity	..	3,415 per K.W.	2300	1½c per K.W.	.440	0.0		15	.518	
x Fuel Oil	20	135,000 per gal.	2300	$.06 per gal.	.045	66.0	30.0	15	.240	.092

x Using 1/3 lb. steam per lb. of oil.
Hidden costs such as handling, etc., have not been considered in the oil costs.

Low Temperature Carbonization of Coal

A discussion of general details and various processes used

A. C. Fieldner

Externally Heated Retorts: Coal in Thin Layers Not Stirred—Vertical Layers of Coal in Narrow Retorts

PARKER process: The latest modification of the coalite process of the Low Temperature Carbonization Co., Ltd., of England, is a return to the small diameter intermittently chargede cast-iron retort originally proposed by Parker in 1908. Each retort consists of a solid casting of 12 tubes in a double row of six, each 4½ inches diameter at the top, tapering to 5½ inches in diameter at the bottom and 9 feet long; 32 of these retorts constitute a battery which has a capacity of 50 tons of coal per 24 hours. Figure 1 shows the two-battery experimental plant that I saw in operation at Barugh, near Barnsley, in Yorkshire, England, in July, 1924.

Tests[5] of this plant by the Fuel Research Station of England showed the following yields:

Table II.—Results of Tests by Fuel Research Station of Barnsley Plant

Coke (6½ per cent volatile matter) per cent	70
Gas (700 B.t.u. per cu. ft.), cubic feet.....	5620
Crude tar (dry), U. S. gallons.....	20
Ammonium sulphate, pounds.....	12.2
Crude light oil from gas, gallons.....	1.9
Retort temperatures, deg. C.....600 to 800	
Volatile matter in coal, per cent.....	35

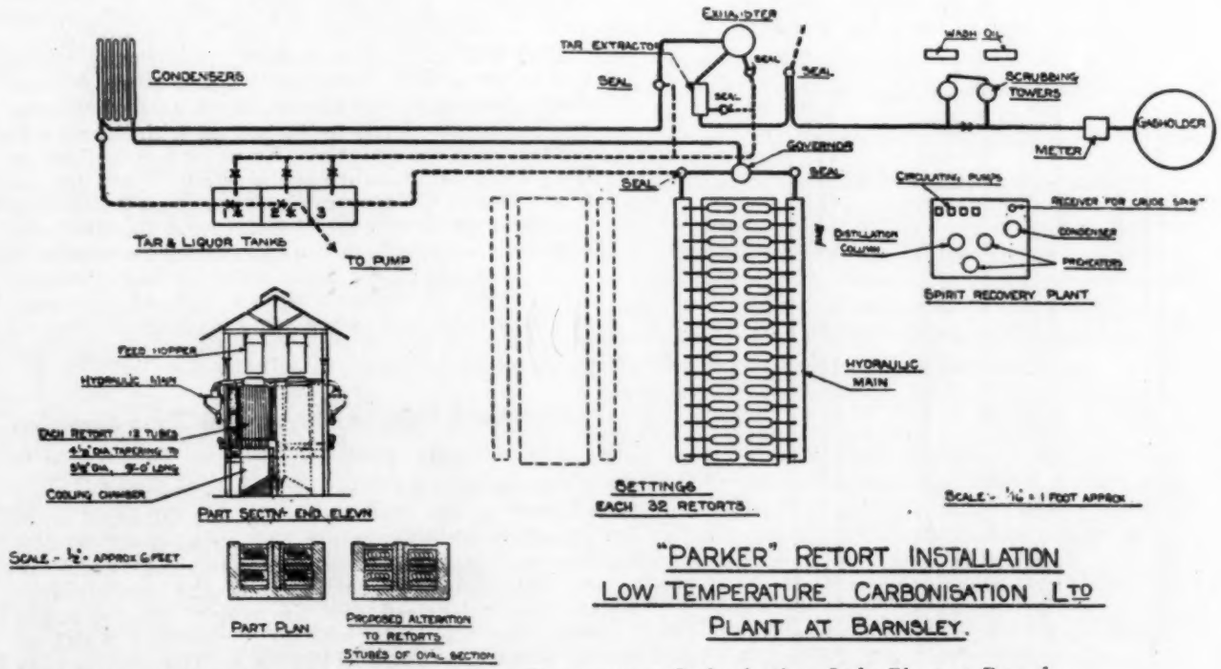

Fig. 1. "Parker" Retort Installation Low Temperature Carbonization, Ltd., Plant at Barnsley

It will be observed that the temperatures were from 100 to 300° C. above that of the usual low-temperature processes. This accounts for the volatile matter in the coke being 6 per cent, instead of the normal figure of 10 to 15 per cent. The tar also suffered some cracking which resulted in a relatively high yield of light oil and gas, as judged by strictly low-temperature standards.

The Barnsley process was devised primarily to make a smokeless solid fuel for domestic purposes, and it accomplishes this purpose. The cylinders of

[5]Report of test by the Director of Fuel Research on Parker low-temperature carbonization plant installed at Barugh, Barnsley, at the works of Low Temperature Carbonization, Ltd. Dept. of Scientific and Industrial Research, H. M. Stationary Office, London, 1924.

coke as discharged from the retort fracture into triangular sections about 3 inches long. The coke is hard and compact and less than 5 per cent passes a ½-inch screen. It ignites readily and gives a good glowing fire. In other words, it is an excellent smokeless fuel.

I have referred to this process in some detail because it represents conditions that will produce suitable smokeless lump fuel, a high B.t.u. gas, an equal quantity of light oil and double the quantity of tar as compared to the high-temperature process. The disadvantages are (1) high cost of operation in charging and discharging so many small test-tube-like retorts, and (2) doubtful life of the cast iron at the temperatures employed. Any warping of the metal will increase the difficulty of discharging the coke. It is proposed to build a 1,000-ton per day plant of this type at the Nottingham Gas Works. Granting technical success, it is questionable whether this process can be carried on economically in competition with present high-temperature gas or coke-oven practice.

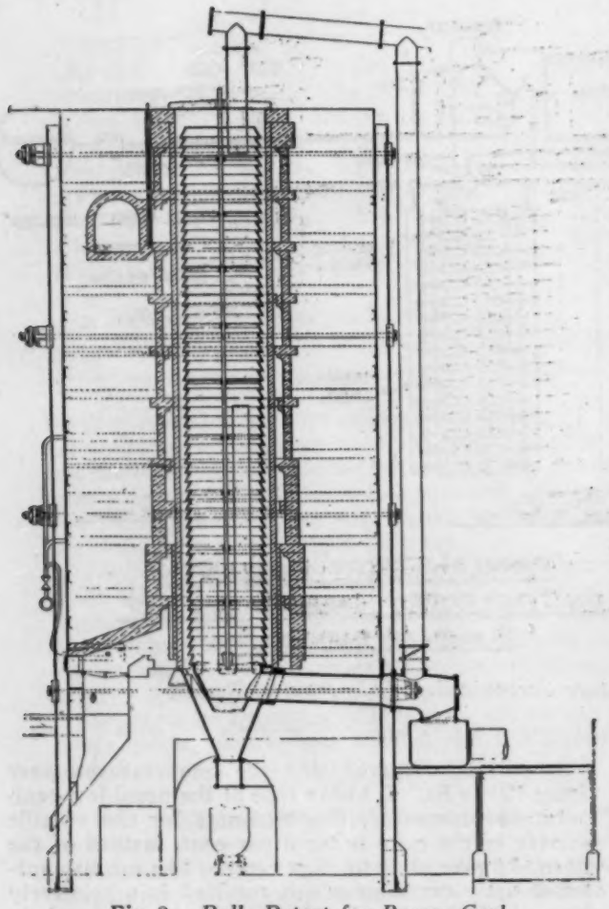

Fig. 2. Rolle Retort for Brown Coal

Wallace process: In the United States, Wallace has used a vertical cast iron cylinder of larger diameter than the Parker retort. In order to increase the rate of carbonization and avoid cracking the tar by the hot retort walls, he has fixed in the center of the retort a perforated tube closed at the top through which the gases and vapors are withdrawn, thus pulling them through the cold coal away from their usual course through the hot coke and up along the retort walls. This type of retort should give high yields of primary tar. However, no commercial plant has yet been constructed.

The Rolle Retort

Rolle Retort: In Germany, the same principle of withdrawing the gas to the unheated center has been used for years in distilling the rich brown coals for their wax and oil content. Figure 2 shows this retort, known as the Rolle oven. The brown coal is charged continuously at the top and descends in the 4-inch annular space between the cast iron rings that form the inner cylinder and the heated firebrick that form the outer shaft. The distillation products are drawn into the interior space and out through the bottom of the oven. The brown-coal residue is a charcoal-like granular material about the size of rice. It is called "Graudekoks" and is sold as domestic fuel for use in specially constructed stoves and ranges. It is easily ignited and burns without flame with very little excess air. A heap of "Grudekok" will burn slowly to the bottom with the air that diffuses into the material. To minimize cracking of the oils the temperature in the retorts is not permitted to exceed 450 degrees C. The output is low, only four tons per retort in 24 hours, and the first cost and space occupied per ton of material carbonized is high. The use of the Rolle retort is limited to the soft, earthy, non-coking brown coals of Germany, and even there efforts are being made to develop retorts of much higher capacity which employ internal heating by hot gases.

Horizontal Thin Layers of Coal Piron-Caracristi Process

During the past year the Piron-Caracristi process adopted by the Ford Motor Co. has attracted much attention. A 400-ton per day oven, about 50 feet long and 4 feet wide, was completed in 1924 at Walkerville, Ontario, contiguous to the power plant burning pulverized fuel, in which the pulverized semi-coke was to be burned. An outline sketch of the furnace is shown in Figure 3. The process is as follows:[6]

The crushed coal is charged into a series of shallow cast-iron pans 36 by 18 by 1 inch deep, which are part of a continuous chain belt. The coal layer is about ⅝ inch deep. During the carbonization period the coal particles do not move in relation to each other, but are free to swell, become pasty, and fuse into a sheet of coke, which detaches itself from the pan during the return of the belt.

The heat is applied to the coal through a melted lead bath on the surface of which the pans float and are dragged along from one end of the bath to the

(Continued on page 182)

As The Journal Views It

THE ORANGE STAR CAMPAIGN OPENS

The Commercial Section of the American Gas Association recently announced the opening of the Orange Star Campaign, with an architects' contest. This marks the first practical step in the campaign, and the American Gas Journal and the editor personally wish to take this opportunity of extending to the gentlemen who have given of their time and energy to prepare this work best wishes for success. It is certainly a task that has taken considerable of their time and is one that is of the greatest significance to the gas industry as a whole.

In fact, it is a high light in the progress of the gas industry in America, for it marks the inauguration of a plan of action of real national scope for increasing gas and gas appliance sales. This plan is of similar nature to those that have been undertaken in other industries and that have led to such wonderful results. We need only mention the "Save Your Surface" campaign of the paint and varnish industry, which had such a remarkable effect in increasing the sales of paint paint during the past four years.

We wish to point out, furthermore, that just as the "Save Your Surface" campaign gave the paint industry an accurate insight of what the real purpose of paint was, so the Orange Star campaign will give commercial gas men a clear idea of the real service that gas has rendered and can continue to render in even more extensive form to the home owner and the home dweller. It is a work that is of great significance, not so much in that it is going to increase gas sales, but in that it is going to make known to the public in general the peculiarly advantageous properties of gas fuel as a cooking and heating agent in the home and to make life more comfortable and worth while living.

We bespeak the co-operation of the gas industry in this undertaking of the Commercial Section, and we know that this co-operation will be afforded. We feel that if the gas men of the country work together and give each other the fullest co-operation, the plan will work out successfully.

The note of warning must be struck against the danger of expecting results too quickly and in being discouraged because they do not appear as rapidly as expected and hoped for. Such a campaign as the Orange Star campaign cannot get under way as rapidly as we would all like to see it happen, and results cannot be expected until it has been operating at full speed for some time. Therefore, it is incumbent upon the gas men and the gas companies, who undertake this work, to exercise patience and to keep plugging at it and eventually they will be rewarded by success. Let us all pull together in this work for the aggrandizement and mutual benefit of the gas industry and the gas consuming public!

UNIVERSITY INSTRUCTION IN PUBLIC UTILITIES

It was not so long ago that the announcement of a university to the effect that it intended to give instruction in matters of interest to public utility employees was received with surprise and extreme gratification. Today it is quite common for the universities of this country to pay special attention to the problems of the public utility industry. While this work has been done to a certain extent in the classroom, the latest development is along extension lines, and it must be said that extension work has perhaps a greater appeal to the average utility employee than instruction work in the classroom, because of its easier availability.

It is thus with great interest that we read of the opening of an extension course on public utility problems at Rutger's University in New Jersey. This is the first time that such work has been undertaken in a university in that state. The courses, it is said, will include class instruction as well as correspondence instruction and the subjects will range from the elementary mathematics, mechanics, drawing, engineering and the like, to special instruction on public utility problems such as public utility economics and public relations.

Thus, another university has entered the field and swelled the number of those that have recognized the importance of giving the public utility em-

ployees, and the students who are interested in public utility matters and who expect to enter that field on graduation, an opportunity to obtain scientific instruction in matters pertinent to this field. It is hoped that the gas companies in the state of New Jersey will see to it that their employees take advantage of this splendid opportunity.

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THE FUTURE OF GAS IN INDUSTRY

(Continued from page 178)

who also usually make oil-burning equipment. Competition is so keen among these manufacturers that they have neither the money nor the time to spend for research and advertising and as a result the men who have gas to sell do not get the same co-operation from them that the electrical men get from the controlling electrical manufacturers.

The power companies in turn co-operate with the manufacturers in the way of making flexible rates that can be applied to all classes of electrical heating, often sacrificing net revenue until business builds up to a point where it will be profitable.

Electricity Not a Fuel in Industry

We will grant the supremacy of electricity in the lighting field and for furnishing power, but any deviations from those fields is a digression from its proper sphere which seemingly cannot be justified from an economic viewpoint.

We must realize that electrically heated equipment has been and is being put into use solely because of the fact that appliance manufacturers have given the electrical men the advantage of advertising and co-operation, and it seems inconceivable that gas will not ultimately prevail in its sphere when gas men are given even a small measure of such support from some source.

At the present time it hardly seems possible that the manuacturers of gas appliances can be consolidated or organized for this purpose, therefore it becomes necessary that some other plan be worked out. The situation is so fraught with possibilities that our National Organization will no doubt evolve some workable plan.

The thought may have occurred to you while listening to the reading of this paper, that a great deal has been said about electricity and not enough about gas. This has been done purposely. It should not be necessary to sell the gas man on his own product. We will never get anywhere by going around shaking hands with ourselves and assuring ourselves and each other that gas is the best industrial fuel. We all know this. But does the factory superintendent and the metallurgist know it?

Gas sales for industrial purposes have increased 20% to 25% each succeeding year. Appliances and methods have now been so perfected that immediate steps must be taken to get the proper information into the hands of industrial executives, otherwise we will be participants in a losing battle for a time.

The future of industrial gas will be assured when accurate, comparative data covering every possible operation is available to the gas man.

One of the first rules of competition is that one must study the style and methods of one's opponents. Now. in view of the fact that we have the examples of our worthy competitor very much before us at this time, let us broadcast the truth to the world, that, if it can be done with heat, it can be done not only better, but more cheaply, with gas.

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LOW TEMPERATURE CARBONIZATION

(Continued from page 180)

other. The temperature of the bath is maintained by burning gas in cast-iron flues immersed in the lead, which is contained in a water-cooled clay refractories tank. As the temperature of the lead can be

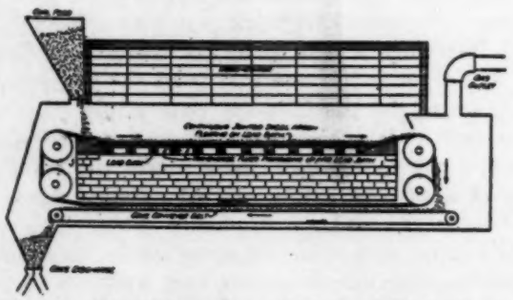

Fig. 3. The Piron-Caracristi Lead-Bath Process

readily ascertained and controlled, the coal is subjected to a uniform definite temperature through the transfer of heat from lead to iron pan, thence to the thin layers of coal in the pans.

The volatile matter evolved escapes to the condensers through ducts in the wall of the distillation chamber over the lead bath, without being subject to higher temperatures than were intended.

While the quantity of coal in each pan is small, the time necessary to allow for satisfactory carbonization of the thin layer of coal is so short, less than five minutes is the claim, so that the furnace as a whole may have a large daily output.

Preliminary operation of this plant at Walkerville showed that all details of design had not been worked out satisfactorily.[7] It is a question if metallurgical science has yet developed a method of reasonable cost from which may be constructed a suitable chain mechanism that can be operated over a long period at a temperature of 650 degrees C. It is also difficult to design a charging and discharging mechanism which will never admit excessive quantities of air into a large retort space.

(*Editor's Note: This is the second installment of Mr. Fieldner's comprehensive discussion of low temperature carbonization, the first appearing in the January 16th issue. Other installments will appear in later issues.*)

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

Lesson No. 109

Combustion

Classification of Coals

Then there is that class of bituminous coal, which contains from 85 to 80 per cent of carbon, from 5.0 to 5.8 per cent of hydrogen and from 10 to 14.2 per cent of oxygen and which melts and gives a residue that is compact and hard but not puffed. This is the coal that is mostly used for gas making and is known as gas coal. Then there is another kind of bituminous coal which is the coking coal proper and is used in furnaces and forges. This coal contains

Summary of Methods of Coal Classification

Classification	Basis of Classification	Advantages and Disadvantages
Frazer's	1. Ratio $\frac{\text{Fixed Carbon}}{\text{Volatile Matter}}$	1. Only proximate analysis needed 2. Unsuited for western coals
Ralston's	1. Per cent composition (carbon, hydrogen, and oxygen) on a moisture-, sulfur-, nitrogen- and ash-free basis	1. Analysis difficult 2. Lines of demarcation not sharp
Campbell's	1. $\frac{\text{Carbon}}{\text{Hydrogen}}$ ratio 2. Appearance of coal 3. Action of coals on weathering	1. Gives an easy method for differentiating the bituminous, sub-bituminous and lignite coals from each other 2. Ultimate analysis required
White's	1. Per cent oxygen on moisture- and ash-free basis 2. $\frac{\text{Oxygen}}{\text{Hydrogen}}$ ratio	1. Per cent oxygen hard to determine 2. Gives some idea as to coking property of the coal
Twelfth International Geological Congress	1. Proximate and ultimate analysis	1. Classifies coals into the well-recognized commercial grades
Regnault-Gruner	1. Ultimate and proximate analysis 2. Coke characteristics 3. Chief uses	1. Requires long ultimate analysis 2. Very complete
Ashley's	1. Fuel ratio and $\frac{\text{Fixed Carbon}}{\text{Moisture}}$ 2. Advocates new names for coals based on localities	1. Requires only proximate analysis on the "as received" basis 2. Names proposed of doubtful value
Parr's	1. Per cent volatile matter and heating value of unit coal substance	1. Requires only proximate analysis 2. Differentiates the eastern from western bituminous coals

from 89 to 84 per cent of carbon, 5.5 to 5 per cent of oxygen and yields from 74 to 68 per cent of coke. Finally, there is that sort of bituminous coal which melts very thoroughly and gives a residue which is very hard and puffed. This is known as caking bituminous coal. It contains between 90 and 88 per cent of carbon, 4.5 to 5.5 per cent of hydrogen and 5.5 to 6.5 per cent of oxygen. It yields 82 to 74 per cent of coke.

These tests and the classification of coals are of the highest importance from a commercial standpoint, for it is understandable that a coal which melts easily cannot be burnt under boilers without giving rise to a great deal of grate trouble. Then again a coal that does not possess the correct amount of volatile matter cannot be used for gas making under present conditions, although it is probable that all grades of bituminous coals will eventually be used for gas manufacture.

Another System of Classification

Before leaving the question of the classification of coal, it should be emphasized that there are quite a few methods by which coal can be classified, and that the results obtained from these methods will vary to some extent. It is interesting, therefore, to note the following summary of methods of coal classification which describes eight important systems as well as their advantages and disadvantages. This table is taken from the very excellent book on Fuels and Their Combustion, by Robert T. Haslam and Robert P. Russell.

A Splendid Sales Idea

Practical demonstrations make for sales

J. B. Dillon

OUTSIDE there was three or four inches of snow on the ground, while from above the beautiful snow crystals were falling. An ideal winter day, one of those days that brings joy to the farmer and those who have a garden in mind for the spring time, those who want beautiful flowers to surround the home. It is people like those who love the snow, for does it not mean plenty of water for irrigation when old Sol does his best to "burn 'em up," or perhaps we are doing the old boy an injustice, for, after all, without him water would be ineffective.

Contrariwise, it was a day that those who live in apartments, hotels, etc., say, "B'rr, darn, but it's nasty," and their thoughts revert to the warmth of the room.

Be this as it may, we were out in it and, like Towser, we were catching an occasional flake in our mouths and grinning, our destination being the Public Service Company's main sales room. As we entered the door we felt some warm waves and, sure enough, right alongside of the door, a mantel had been erected; within the fireplace a gas heater was in full play and many stopped to feel its warmth, view its natty appearance and to comment upon its worth. One of the most forceful remarks we heard was:

Practicality Demonstrated

"Well, I declare! I always thought these gas 'fireplaces' were pretty to look at, an ornament to the room, but I never dreamed that they were so practical," said an old fellow. That started a conversation between the crowd about the heater and there was not a dissenting voice.

Now, then, even though we did not witness an actual purchase we did witness the "satisfied customer attitude" and it is safe to say that some of those who saw the demonstration will buy, will talk about it, and others will buy. It again emphasizes the fact that if you expect to sell your wares you must display them to the best advantage and if there was ever a more advantageous display the writer never saw or heard of it.

Directly ahead of this gas heater there were two long rows of gas ranges, all of popular make and nationally advertised. I remarked to one of the salesmen:

"Now, then, you ought to feel proud of your job, selling these handsome gas ranges at reduced prices, and having a crowd to brag about your gas heaters. And you just sold one of 'em ranges."

"Believe me, I am; I'm almost tempted to buy one myself and save it until somebody I know gets married and hand it to them for a wedding present."

"When it's heat, think of gas." How's anybody going to help from doing that when they are so encouraged. All of us can do the same!

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TO KEEP YOUR GAS STOVE RUSTLESS

Rust is the chief enemy of the gas stove, according to a recent bulletin of the Smithsonian Institute, and can be avoided by the use of simple precautions.

Rust in the oven can be overcome if the oven door is left slightly open after the burners are lit. The open door permits the escape of the moisture which is produced by combustion and prevents its too rapid condensation on the sides of the oven.

A further protection for both oven lining and burners is the occasional application of oil or grease, which must be free from salt and which should be applied while the metal is warm.

PROGRESS IN GAS TECHNOLOGY
Domestic and Foreign

IMPROVEMENTS IN WATER GAS MANUFACTURE

WATER gas is generally made by an intermittent process, periods of actual gas making being alternated with periods of blowing. The economic feature of the process is, of course, to utilize the thermal energy in the air gas for gasifying the fuel oil in the presence of water gas, which is made simultaneously.

When a highly carburetted water gas is being made which requires the consumption of a large amount of gas oil in practical operation, it is possible to use all of the potential energy in the producer gas for the gasification of this oil, through complete combustion in the fixing chambers of the carbon monoxide contained in the gas by means of a secondary air. But under such conditions as are prevalent at the present time the gas thus manufactured is of a low calorific power. Furthermore, as a smaller proportion of oil gas is required per volume of blue water gas, it is almost impossible to reduce the percentage of carbon monoxide in the air gas, with the result that unburned carbon monoxide escapes into the atmosphere and is lost.

The invention, which is patented in French patent No. 587,850, is concerned with utilizing the latent heat which is lost in the form of carbon monoxide in the gas that is used to heat the generator. According to this process, practically all of the carbon monoxide contained in this gas is burned in the fixing chambers at the beginning of the blowing period up to the point where the temperature required in the fixing chambers is obtained, at which time the supply of secondary air is cut off. After a few seconds, which are required for purging the fixing chambers of the products of combustion thus obtained, the blowing of the generator is continued until the fuel bed has attained the desired temperature.

Summing up, the process consists essentially in manufacturing carburetted water gas by combustion of practically all the carbon monoxide contained in the air gas. The combustion is continued until the required temperature is reached in the fixing chambers and at that moment the combustion of carbon monoxide is stopped and the rest of the gas is then mixed with the carburetted water gas.

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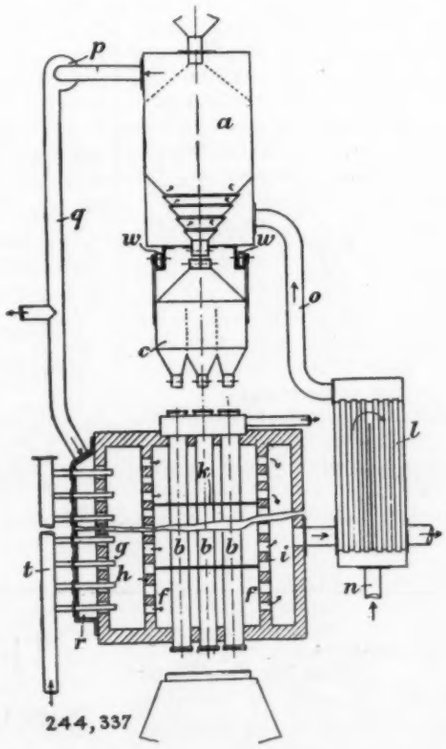
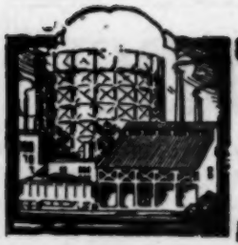
PROCESS AND APPARATUS FOR PRODUCING COKE, GAS AND TAR FROM SOLID FUEL

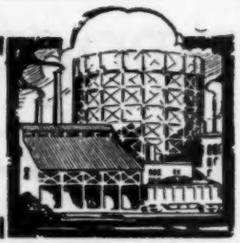
THIS apparatus is a development of that described in Specification No. 204,718 (see the Chemical Age, Vol. IX, p. 611) in which fuel is carbonized in two stages in an internally heated low-temperature retort, and in an externally heated high-temperature retort. The fuel passes downward from the internally heated retort (a) to an intermediate chamber (c) suspended on runners (w), so that the fuel can be distributed to various groups of externally heated retorts (b). The heating flues (f)



of the retorts (b) are provided with horizontal baffles (k), and combustion gases pass from the chamber (g) through the perforated wall (h) into these flues. The combustion gases pass through another perforated wall (i) to a heat interchanger (l) to which air or other gas passes by a pipe (n). The heated air passes by a pipe (o) to the preheater (a). The air and combustible gas pass through a fan (p) and pipe (q) to a distributing chamber (r), where the gas meets the fuel gas supplied from a pipe (t). The fuel is heated in the retort (a) to a temperature below that at which the plastic state commences, so that the resistance to the passage of the heating gas is low. Very little gas and tar are liberated in this retort, so that air may be employed for heating without danger of igniting the fuel, and the air may then be used immediately for combustion purposes. —British Patent 244,337.



NEWS OF THE GAS INDUSTRY



Illinois Gas Association to Meet in March

Interesting and Comprehensive Program Has Been Prepared

The 1926 meeting of the Illinois Gas Association will be held in March, in conjunction with the meetings of the Illinois State Electric Association and the Illinois Electric Railways Association. In the joint meeting of these associations, which is generally held during the convention, Lucius S. Storrs, managing director of the American Electric Railways Association, and M. H. Aylesworth, manager and director of the National Electric Light Association, will deliver addresses. President H. C. Abell and Major Alexander Forward of the American Gas Association have also been invited to appear on the same program.

On March 18 a joint session will also be held, the program being turned over to the Illinois Committee of Public Utility Information and the Public Speakers Bureau. Among those on the program for this day are John F. Gilchrist, vice-president of the Commonwealth Edison Co.; Geo. R. Jones, treasurer of Public Service Co. of No. Illinois; Keith Spade, director Public Speaking Bureau; B. J. Mullaney, vice-president Peoples Gas Lt. & Coke Co., together with the ten district chairmen of the Speakers' Bureau.

The following subjects will be discussed in papers and addresses in the gas section:

1—Industrial Gas Uses.
2—Home Service.
3—Practices in Rate Structure.
4—Gas Companies' Commercial Future.
5—High Pressure Distribution.
6—Everyday Contact with Customers.

Tampa Gas Co. Will Triple Its Capacity

Tampa, Fla. — The expansion program of the Tampa Gas Company for this year provides for increasing the daily production from 4,000,000 to 12,000,000 feet of gas to take care of the city's growing needs, according to John C. Gribbel of Philadelphia, president of the company.

In addition, construction of 50 miles of new mains is planned, said Mr. Gribbel, who is in Tampa to confer with other officials of the company relative to the expansion program for the year. A preliminary survey is being made by Mr. Gribbel, D. J. Collins, vice-president; J. D. Shattuck, engineer, and Roscoe Nettles, general manager.

The complete program of activities for the year is expected to be worked out at the annual meeting of the gas company. Three consulting engineers from the North have been called in to assist, it was stated.

Sarasota Launches Plan for Gas Plant

Sarasota, Fla.—At a meeting under the auspices of the Sarasota Chamber of Commerce, the probability of establishing a gas plant in this city took definite form.

Representatives from the Tampa Gas Company, the Philadelphia Gas and Traction Company, the Helena, Ark., Gas Company, and the Lakeland Gas Company were in attendance.

Roscoe Nettles, general manager of the Tampa Gas Company, was the principal speaker, and said the phenomenal growth of this community would warrant the construction of a gas plant. All expressed their willingness to cooperate with Willis Powell, secretary of the local chamber, in securing the establishment of such a plant.

The Year's Best Gas Advertisements

Public Utilities Advertising Association Plans Advertising Exhibit

Two developments of more than usual interest to advertising men in the gas industry are announced by the Public Utilities Advertising Association, a department of the Associated Advertising Clubs of the World.

One is the early publication of a portfolio of the year's best public utility advertisements. Gas company advertisements will occupy considerable space in this book.

The other is the exhibition of public utility advertising literature at the Philadelphia convention of the Associated Advertising Clubs, in June. A giant display devoted exclusively to public utility advertisements will be a feature of this National Advertising Exhibition, as it was at Houston, Texas, last year. One-third of the total space contracted for will be given over to representative advertisements of the gas industry.

The publication last year of the portfolio entitled "Two Hundred Representative Public Utility Advertisements" met with such success that a 1926 edition will be brought out just previous to the Philadelphia convention. It is believed that the three national utility associations will underwrite the cost of the portfolio in order that copies may be distributed free to every advertising man in the public utility business.

All advertising men in the gas industry are invited to take advantage of these opportunities. This means that advertisements of companies manufacturing appliances will be as welcome as advertisements from gas companies themselves, the real test being in the quality of the advertising and its general appearance, questions which are to be solved by special committees.

Two proofs of each piece of literature should be submitted. A hard and fast rule this year is that all material submitted must be on coated paper. The following material is desired from the gas industry:

Newspaper and magazine advertisements.

Direct-by-mail literature, pamphlets, booklets, etc.

Photographs of billboard displays.

Posters, street car cards, etc.

Annual reports and year books, particularly proofs of color cuts.

Color plays a vital part in advertising exhibits today and gas advertising men are asked to keep this in mind when submitting their samples.

Proofs should be sent to Charles W. Person, chairman, exhibit committee, American Gas Association, 342 Madison avenue, New York.

* * *

West Virginia Gas Co. to Purchase Carrollton Co.

Carrollton, W. Va.—The Natural Gas Company of West Virginia has offered to pay $12.50 per share (par value $25) for stock of the American Gas Company, of this place, provided they can secure 51 per cent of such stock. The board of directors of the local company has notified its stockholders of the offer and has designated the Cummings Trust Company as trustees of said stock until not less than 51 per cent has been deposited, when the stockholders will receive payment of same. The West Virginia Company has deposited enough funds to take care of the transfer. Officials of the American Gas Company believe that enough stock will be deposited with the local bank to effect the sale to the West Virginia Company. The deal has been hanging fire for some weeks.

Gas Company Increases Capital to $13,500,000

Austin, Tex.—An amendment to the charter of the Lone Star Gas Company of Dallas, increasing the capital stock from $10,675,000 to $13,500,000, has been granted by the secretary of state. The increase of $2,825,000 will be used in the construction of additional facilities for the transportation and delivery of gas to Dallas, Fort Worth, Wichita Falls and fifty other North Texas cities.

* * *

209,040 Meters Used in St. Louis, Gas Report Shows

St. Louis, Mo.—Revenues derived by the Laclede Gas Light Company, both operating and non-operating, during the year ending Dec. 31, 1925, totalled $11,850,633.94, yielding a profit of $1,770,185.21.

The profit is an increase of approximately $4,000 over 1924. Dividends totalling $1,195,000 were paid during the year.

Gas Securities for Savings Banks

Albany, N. Y.—A bill has been introduced into the Assembly at Albany, N. Y., which would authorize savings banks, under certain conditions, to invest in the bonds of the gas and electric companies, as well as in the bonds of railroad companies. It is to be noted that this bill has the backing of the Savings Bank Association of the State of New York and was prepared by this association.

The provisions of the bill apparently permit savings banks to invest in the bonds of a holding corporation organized under the laws of another state. While the act would take effect immediately, it would be after January 1, 1927, before any such investments could be made.

Merger Announced by Gas Companies

Counties and Suburban Concern Combine with W. A. Lamson as Manager

Spring City, Pa.—A merger has been effected between the Philadelphia Suburban Gas and Electric Company and the Counties Gas and Electric Company, and the entire business in this section is now under the management of William O. Lamson, heretofore superintendent of the Counties Company.

The following statement was issued at West Chester:

"In order to better serve the patrons of gas and electric service now furnished by the Counties Gas and Electric Company and Philadelphia Suburban Gas and Electric Company in West Chester, Coatesville, Downingtown, Malvern and adjacent territory, the companies will combine their facilities under one management.

"It is hoped by this agreement consumers of gas, electricity and steam heat may be able to transact their business at one central office, and questions of service investigation may be more promptly attended to. Announcement will be made from time to time as future policies are arranged for."

The electricity comes largely from the Cromby plant, on the Schuylkill above Phoenixville. The gas used here is made in Conshohocken.

The Counties Company has been furnishing gas and steam in West Chester, while electricity came from the Philadelphia Suburban Gas and Electric Company.

* * *

Gas Co. Franchise Granted

Pinole, Calif.—Permission including franchise rights for the sale and distribution of gas for domestic and illumination purposes here has been granted the Coast Counties Gas Company. The work of bringing in the gas supply is to start no later than March 1.

H. M. Atkinson Announces Financial Changes in Georgia Railway & Power Co.

H. M. Atkinson, on behalf of himself and other stockholders of the Georgia Railway & Power Company, has issued the following statement:

"By agreement consummated January 16, 1926, individual shareholders owning substantially more than a majority of the total outstanding common capital stock of the Georgia Railway & Power Company have agreed to accept in exchange therefor 1.633 shares of cumulative participating preferred stock and one share of non-par value common stock of the Southeastern Power & Light Company for each share of Georgia Railway & Power Company common stock owned by them.

"When completed, this exchange will bring under centralized unified and co-ordinated ownership and management the Alabama Power Company (a subsidiary of Southeastern Power & Light Company) and Georgia Railway & Power Compnay.

"The individual stockholders of both companies, parties to this agreement, believe that this merger of their interests, in effect partnership, will result in economic advantage of direct benefit to the public served because a stronger agency, both in financial and physical resources, for efficient and continuous public service, will be the result.

"The agreement reached will make possible more effective and continuous use of present operating water power and steam plants and will result in future co-operative development of water power in the various water sheds of Georgia and Alabama.

"In addition, auxiliary steam power generated to the extent necessary at the mouth of the Alabama coal mines will be connected by wire with and made available throughout the territory served, a condition of great economic and industrial advantage.

"The several companies involved, including their subsidiaries, have for many years had continuous records of successful management and development. Each of them has performed important service in the industrial and business development of the Southeast. In partnership they will be strengthened in every resource and will have increased opportunity to contribute to a greater degree than ever to the industrial and business progress of a very large and rapidly growing section of the South.

"Alabama Power Company and Georgia Railway & Power Company will continue as individual operating companies, with their own organizations and management, under the local state laws, maintaining their own financial structures and subject to public regulations as to dates and security issues within the respective states served.

"The present policies and management of the Georgia Railway & Power Company will continue. No change in the organization personnel is contemplated."

Absorbs Utilities

Denver, Colo. — The Standard Gas & Electric Company has acquired the controlling stock of the California-Oregon Power Company and the Wisconsin Public Service Corporation, and will operate both concerns as part of the Standard Gas & Electric system. To finance a public offering of seven and a half million dollars 25-year 6 per cent debentures of the Standard will be offered to the public.

* * *

Citizens Gas Co. Directors Re-elect Officers

Racine, Wis.—At the recent annual meeting of the Citizens Gas Co. the following officers of the company were re-elected:

The retiring director, A. Bushman, was re-elected, and the directors then proceeded to re-elect the retiring officers for another term. These officers are as follows: H. A. Runkel, president; A. Bushman, vice - president; Eda Meinhardt, treasurer, and C. B. Wagner, Jr., secretary.

Utica Gas Co. Has Notable Show Exhibit

Takes Prominent Part in Made in Utica Show

The Utica Gas & Electric Company has one of the most interesting exhibits at the Made in Utica Show. Two realistic demonstrations will be given. One is a typical hydro-electric plant which generates its own electrictiy by a turbine which is turned by the force of water from a mill pond. A miniature village is lighted by tiny electric lights suspended from genuine but tiny poles.

Gas will be manufactured "while you wait" at the booth. Chemists from the laboratory of the Utica Gas & Electric Company will actually manufacture gas by the latest coal gas methods now being used at the Harbor Point plant of the company. People who visit the booth will see coal actually converted into gas. This will be one of the outstanding events of the exhibit and together with the hydro-electric plant will doubtless attract thousands.

Scores of photographs will show industrial gas installations and applications in the factories of Utica. Singeing, calendering, meat curing, annealing, japanning, baking and heat treating will be some of the processes illustrated. These photographs have just been taken in the industrial establishments of Utica and constitute an educational feature that will be novel. Pictures will also be shown of the model kitchens which use gas throughout at the Hotel Martin and the Masonic Home.

The use of gas for house heating is one of the most rapidly progressing applications at the present time. More than 30 homes in Utica and vicinity are being heated this winter in this manner. It is

a perfectly clean heat, efficient and economical. Worry and effort in its care is eliminated. Many photographs showing these installations and homes will be shown at the exhibit.

Utica gas coke, another product of the Utica Gas & Electric Company, will be shown.

* * *

Gas Company Pays the City

Denver, Colo.—The Public Service Company of Colorado, in accord with its franchise, must pay over to the city of Denver all money collected for gas in excess of 75 cents per 1,000 cubic feet. The company during 1925 sold 30,848,234 cubic feet of gas, an increase of 2,227,043 cubic feet over the year 1924 and received $2,423,263.41 in 1925 and $2,238,488.39 in 1924. It forfeited discounts amounting to $11,290.49 in 1925 and $10,303.03 in 1924. Of the amount collected in 1925 it paid the city $99,718.39, an excess of $26,799.01 over the payment in 1924. Going back to the suit between the city and the gas company, it will be recalled that the gas company for the years 1918-1922, inclusive, paid the city $1,184,665.69 and then in 1923 it paid $193,126.48. The big payment is held in trust for the building of a new court house and city hall, but more recent payments are being placed in the general fund of the city. The disposition of the money rests with the mayor.

* * *

Southern Gas Buys

New York City.—Control of four additional gas properties has been acquired by the Southern Gas and Power Corporation, including the Sabine Utilities Company, which in turn controls the Peoples Gas Company of Port Arthur, Texas. This company's distributing system serves Port Arthur and suburbs; Port Neches and Nederland, Texas. This is the first Texas property Southern Gas and Power Corporation has acquired.

The other acquisitions are the Waynesboro Gas Co., Waynesboro, Pa.; Conewago Gas Co., Hanover, Pa., and Chambersburg Gas Co., Chambersburg, Pa. The total value of the newly acquired properties is said to be $1,598,000.

President Scranton Gives Assurances to Gas Co.'s Stockholders

Ansonia, Conn.—In the course of the annual meeting of stockholders of the Derby Gas and Electric Company, George H. Scranton, president and general manager of the concern, announced that during the past few months several different interests had conferred with the directors' committee relative to taking over the company. Various conferences had been held but, the president added, no offer had been submitted which was deemed sufficiently satisfactory to submit to the directors. President Scranton in assuring the stockholders declared that in any event every stockholder, large and small, would receive the same consideration.

Mr. Scranton was re-elected president and general manager at a meeting of the newly-elected directors, following the stockholders' session. J. Arnold Norcross was re-elected vice-president and Malcolm M. Eckhardt secretary and treasurer.

The directors named at the stockholders' meeting consisted of Frank E. Hoadley, Dr. A. W. Phillips, Walter W. Radcliffe, Daniel E. Brinsmade, Frank M. Clark, Alton Farrel, J. Arnold Norcross, William A. Cowles, Frank D. Wanning and George H. Scranton.

During the stockholders' meeting President Scranton made the following statement:

"Within the past few months we have been approached by several different interests in regard to taking over this company, and at a meeting of the directors a committee was appointed to consider these matters. There have been a number of conferences with different interests, but up to the present time no offer has been submitted that the committee deemed sufficiently satisfactory to present to the directors. In any case, the directors will see that each stockholder receives the same consideration and there will be no distinction between large and small stockholders."

Gas Co. Men Flock to College

New York City.—Seven hundred and ninety men, representing 168 gas companies, three public service commissions and 11 manufacturing companies, have registered for the Home Study Course on Manufactured Gas at Columbia University, according to a report by the American Gas Association, under whose auspices the course is given.

An analysis of the men taking the course shows that 63 per cent are college men and that all but 10 per cent have had the equivalent of a high school education, from which, says the report, "it may be inferred that the gas industry is recruiting its future executives largely from the higher educational institutions."

The Consolidated Gas Company of New York and its affiliated companies have 64 students and the Brooklyn Union Gas Company 60. First place is held by the Peoples Gas, Light and Coke Company of Chicago, with 66.

The course, which is given by mail, was designed to give employees in the gas industry an opportunity to improve their technical knowledge and covers not only the underlying principles of gas service to the public, but various phases of manufacture and distribution.

* * *

Thomson Meter Corp. Chartered

Albany, N. Y.—Thomson Meter Corporation, New York City, manufacturing fluid meters, pumps and gas instruments, has been chartered at Albany with 1,000 shares non par value. William Ferguson, 1203 East 19th street, Brooklyn, R. Kinnaird Bissell, 880 St. Nicholas avenue, and W. Sherman Greene, Jr., 614 West 113th street, New York City, are the directors and subscribers.

Peoples Gas Light Gains

The annual report of the Peoples Gas Light and Coke Company of Chicago for 1925 indicates net income of $4,852,523, compared with $4,275,346 the previous year. Gross operating revenues totaled $31,854,551 and operating expenses $22,425,585, leaving net operating revenues of $9,428,966. The balance sheet shows current assets of $8,517,461 against current liabilities of $5,995,041.

"Sales of gas for strictly industrial purposes," says the report, amounted to 3,740,000,000 cubic feet, an increase of 427,000,000 cubic feet, or 13 per cent, over the total similar sales in 1924.

"Industrial sales were stimulated by an adjustment in the wholesale rate, which became effective in August, as well as by better selling methods. This added an average of 35,500,000 cubic feet per month to the total sales for the year. On the basis of business already acquired and new installations reasonably assured, it is expected that sales in 1926 for strictly industrial purposes will continue to increase.

"The agricultural implement industry, which alone took 125,000,000 cubic feet of gas in 1924, used 195,000,000 cubic feet in 1925."

W. F. Eve, Jr., Appointed New Business Manager

Augusta, Ga.—R. J. Hole, vice-president of the Southern Gas and Power Corporation, announces the promotion of William F. Eve, Jr., new business manager, effective at once. This appointment places Mr. Eve in charge of the commercial activities for the Southern division of the Southern Gas and Power Corporation, consisting of the following properties: The Gas Light Company of Augusta, the Tri-City Gas Company, Gadsden, Ala.; the Concord-Kanappolis Gas Company, Concord, N. C.; the Gastonia-Suburban Gas Company, Gastonia, N. C., and the Valdosta Gas Company.

Mr. Eve has been with the Gas Light Company of Augusta for the past nine years and during this period has worked in practically every department, having started as appliance salesman in 1917. He was promoted to the position of superintendent of distribution in 1918 and served in this capacity seven years. As superintendent of distribution, Mr. Eve had charge of all construction work in connection with the distribution department and it was during his administration of the office that the present booster system of distribution to the Hill Section was planned and installed.

In January, 1925, Mr. Eve was appointed new business manager of the Gas Light Company of Augusta and under his administration the new business department has just closed a most successful year. One of the outstanding accomplishments was the promotion work done in connection with the North Augusta main extension.

Mr. Eve's many friends are congratulating him upon his appointment, wishing him much success in his new field of activity, and are glad to know that he will continue to make Augusta his headquarters.

* * *

Contracts Awarded

The Gas Machinery Company of Cleveland, Ohio, has been awarded a contract by the Cambridge Gas Light Company, of Cambridge, Mass., for a new 48-inch ammonia concentrator for the recovery of volatile and fixed ammonia.

This new equipment will be placed in buildings to be especially prepared for same and provision will also be made and space provided for a sulphate of ammonia plant.

The concentrator equipment will be so arranged that sulphate of ammonia, with its necessary storage and space for handling, will be provided for.

* * *

Tampa Leads U. S. in Percentage of Gas Use Increase

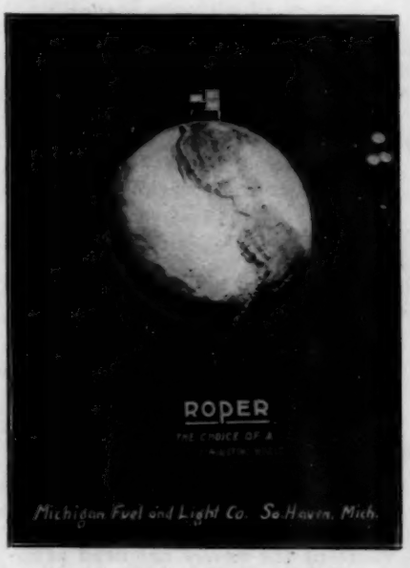
Company to Spend $1,500,000 in Extensions of Service

Tampa, Fla.—Percentage of increase in gas consumption was greater in Tampa last year than in any other city in the United States, it was revealed at the annual meeting of stockholders in the gas company.

Officers and directors were reelected and a new office, that of assistant secretary, was created with appointment of Harold P. Anderson.

Last year was the most prosperous in the history of the local company, reports to the directors showed, although demands made for expansion to serve the constantly growing territory called for increasingly large expenditures. It was brought out that a budget providing for more than $1,500,000 to be spent for improvements and extensions this year had been approved. Even this sum, it was said by the directors, might fall short of requirements.

Officers chosen were: President John Gribbel; vice-president and treasurer, David J. Collins; consulting engineer, J. D. Shattuck; manager and secretary, Roscoe Nettles; assistant secretary, Harold P. Anderson; attorney, Peter O. Knight, the last named, with Messrs. Gribbel and Collins, comprising the board of directors.



An Attractive Range Display